

REMARKS

In response to the above Office Action, claim 1 has been amended to include the subject matter of claims 3 and 6 and claims 3 and 6 as well as claim 2 have been cancelled. Claim 7 has been amended to depend from claim 1 and claims 8 and 9 rewritten for clarity. In addition, claims 11 and 12 have been cancelled and rewritten as new claims 16 and 17. Finally, claim 15 has been cancelled. Thus the claims now remaining in this case are claims 1, 4, 5, 7, 8, 10, 14, 16, and 17.

In the Office Action, the Examiner rejected claims 1-2, 4-5, 7-8, 13-14 (sic 1-2, 4-5, 7-8, and 14) under 35 U.S.C. §103(a) for being obvious over Gray (USP 5,885,547). Now that claim 1 includes the subject matter of both claims 3 and 6, it is believed this rejection with respect to claims 1, 2, 4, 5, and 7 is moot. Its withdrawal as a ground of rejection of these claims is therefore requested. This leaves just claims 8 and 14.

Claims 1-5, 8, and 15 were rejected under 35 U.S.C. §103(a) for being obvious over Gray in view of Day (USP 5,302,369). Now that claim 1 includes the subject matter of claim 6 and claim 15 has been cancelled, it is believed this rejection with respect to claims 1-5 and 15 is moot. Its withdrawal as a ground of rejection of these claims is therefore requested. This leaves just claim 8.

Finally, claims 1-8, 10-15 (sic 1-8, 10-12, 14, and 15) were rejected under 35 U.S.C. §103(a) for being obvious over Gray in view of Day and further in view of Huang (USP 5,073,404).

With respect to claim 1 and the rejection over Gray in view of Day and Huang, the claimed radioactive microsphere has high radioactivity because it contains phosphorous which has a half-life longer than that of yttrium as well as 47% by weight

or more of radioactive yttrium. In addition, the claimed radioactive microsphere has excellent chemical durability, because it not only comprises not less than 99% by weight of an oxide crystal consisting essentially of YPO_4 or a mixture of Y_2O_3 and YPO_4 , but also it is coated with a film having an acid resistant property (see Examples 2 and 4).

On the other hand, Gray does not disclose a microsphere containing any phosphorous.

Day's may disclose radioactive microspheres containing phosphorous and yttrium, but they are much poorer in both yttrium content and phosphorous content than the claimed radioactive microsphere because the microspheres are of glass and the contents therefore are naturally restricted within a range capable of forming a glass. Thus they are more inferior in chemical durability. See, for example, column 2, lines 53-59 of Day. On the other hand, the claimed microspheres comprise not less than 99% of an oxide crystal that consists essentially of YPO_4 or a mixture of Y_2O_3 and YPO_4 . This is not taught by Day. See, for example, the composition diagram of FIG. 1 of Day. See also column 5, lines 15-20 where there is at least 20% SiO_2 in the glass compositions. Moreover, it is not seen where Day teaches that the phosphorous is in the form of yttrium phosphate as claimed. All Day teaches is that yttrium and phosphorous are incorporated into the microspheres. See column 6, lines 57-58 of Day.

Accordingly, since M.P.E.P. §2143 requires that the combination of references relied on to establish a prima facie case of obviousness must teach or suggest all of the claimed limitations and the combination of Gray and Day does not disclose at least the

claimed oxide crystal, it is submitted the claimed oxide crystal is not obvious over Gray in view of Day.

Moreover, as noted above, the claimed radioactive microsphere in claim 1 also includes a specific film coating. In an earlier Office Action (April 9, 2003 - page 4), the Examiner argued that Day "indicates that the radioactive microspheres can contain silica and/or further be coated with additional coating material to control the leaching of radioactive material" citing four different places in Day and that Huang teaches a silica composition as a coating for glass microspheres. Therefore, presumably that it would be obvious to coat the radioactive microspheres of Gray as modified by Day to include phosphorous with the silica composition of Huang.

However, Day may teach that the microspheres can contain silica because they are of glass, but it is not seen where Day teaches, at least in any of the cited passages, where the microspheres can be "coated with additional coating material." Thus it is submitted that any suggestion to coat the microspheres of Gray in the first place, let alone with one or more of the claimed compounds, cannot be said to come from Day.

Huang may disclose a silica coating composition of a silica sol and an organic polymer for glass microspheres, but the coating is to enhance soil repellency and the reflectivity of the spheres. See, for example, column 2, lines 42-47 of Huang. Applicants' film coating on the other hand is to improve the chemical durability of the claimed radioactive microspheres. The microspheres of Gray and Huang are entirely different and therefore any suggestion to use a silica coating on one cannot be said to be a suggestion to use it on the other, particularly when the coatings are used for entirely different purposes. It is submitted, therefore, that any suggestion to use a silica

coating on the radioactive microspheres of Gray comes from a reading of applicants' specification and not from anything taught by this reference.

Accordingly, it is submitted that amended claim 1 is not obvious over the combination of Gray in view of Day and Huang, and its withdrawal as a ground of rejection of claim 1 and claims 4, 5, and 7 dependent therefrom is requested.

With respect to claim 8 and the rejections under §112 and over Gray alone, Gray in view of Day and further in view of Huang, one of the steps in the claimed process is that the starting material is melted by passing it through "a high frequency induction thermal plasma." The McGraw-Hill Dictionary of Scientific and Technical Terms defines the term "high frequency" as a frequency band of 3 - 30 MHz in the radio spectrum. See Exhibit A attached. Thus it is submitted that the claimed term is not a relative term and does not render the claim indefinite under §112. Its withdrawal as a ground of rejection of claim 8 and the claims dependent therefrom is therefore requested.

Moreover, high frequency induction thermal plasma is quite different in principle from the DC plasma disclosed in Gray used to melt starting material. See column 5, lines 33-35. Accordingly, it is not believed that the method of claim 8 or that of new claim 16 which includes this step can be considered obvious over Gray alone.

The same is true over Gray in view of Day or further in view of Huang. Neither Day nor Huang disclose high frequency induction thermal plasma.

Moreover, with respect to claim 16, (formerly claim 11), this claim includes the additional step of heating the starting material after it is melted "in an oxidizing atmosphere." This improves the chemical durability of the spheres without changing their composition. Gray does not disclose this step of heating the spheres in an

oxidizing atmosphere. Accordingly, it is not believed that claim 16 can be considered obvious over Gray for this additional reason. Day and Huang relate to glass microspheres, not the claimed radioactive microspheres so it is not material whether or not they teach the claimed step.


It is believed claims 1, 4, 5, 7, 8, 10, 14, 16, and 17 are in condition for allowance.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 
Arthur S. Garrett
Reg. No. 20,338

Attachments: **Page 690 from McGraw-Hill Dictionary of Scientific and Technical Terms (Exhibit A)**

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- high definition** [COMMUN] Television or facsimile equivalent of high fidelity, in which the reproduced image contains such a large number of accurately reproduced elements that picture details approximate those of the original scene.
- high enema** [MED] An enema injected into the colon.
- high-energy astrophysics** [ASTROPHYS] A science concerned with studies of acceleration of charged particles to high energies in space, cosmic rays, radio galaxies, pulsars, and quasi-stellar sources.
- high-energy bond** [PHYS CHEM] Any chemical bond yielding a decrease in free energy of at least 5 kilocalories per mole.
- high-energy electron diffraction** [PHYS] Diffraction of electrons with high energies, usually in the range 30,000-70,000 electron volts, mainly to study the structure of atoms and molecules in gases and liquids. Abbreviated HEED.
- high-energy fuel** [MATER] Fuel that upon combustion provides greater energy than that from conventional carbonaceous fuels; specifically, a hydroboron.
- high-energy particle** [PARTIC PHYS] An elementary particle having an energy of hundreds of Mev (million electron volts) or more.
- high-energy physics** See particle physics.
- high-energy scattering** [PARTIC PHYS] Collisions of particles with energies of hundreds of Mev (million electron volts) or more, sufficient to produce new particles.
- high-epithermal neutron range** [NUCLEO] The neutron energy range of 1000 to 100,000 electron volts.
- higher high water** [OCEANOGR] The higher of two high tides occurring during a tidal day.
- higher low water** [OCEANOGR] The higher of two low tides occurring during a tidal day.
- higher mode** [ELECTROMAG] A waveguide mode whose frequency is higher than the lowest one.
- higher pair** [MECH ENG] A link in a mechanism in which the mating parts have surface (instead of line or point) contact.
- higher plane curve** [MATH] Any algebraic curve whose degree exceeds 2.
- highest common factor** See greatest common divisor.
- high etch** See dry-relief offset.
- high-expansion alloy** [MET] An alloy possessing a high coefficient of expansion.
- high-expansion foam** [MATER] Noncombustible foam made from ammonium lauryl sulfate; used in underground mine fire fighting.
- high explosive** [MATER] An explosive with a nitroglycerin base requiring a detonator; the explosion is violent and practically instantaneous.
- high-explosive bomb** [ORD] 1. Any aerial bomb charged with a high explosive. 2. Any bomb chiefly dependent upon its explosion or blast effect to create damage.
- high-explosive plastic** [MATER] High-explosive substance or mixture which, within normal ranges of atmospheric temperature, is capable of being molded into desired shapes. Also known as plastic explosive.
- high-explosive plastic antitank charge** [ORD] A shaped charge coupled with a high-explosive plastic charge, intended to produce jet penetration followed by a detonation of the plastic charge. Abbreviated HEPAT charge.
- high-explosive plastic projectile** [ORD] A thin-walled projectile, filled with plastic explosive; designed to squash against an armored target before detonation, and to defeat the armor by producing spalls which are detached with considerable velocity from the back of the target plate. Abbreviated HEP projectile.
- high-explosive projectile** [ORD] Projectile with a bursting charge of high explosive.
- high fidelity** [ENG ACOUS] Audio reproduction that closely approximates the sound of the original performance. Also known as hi-fi.
- high-field superconductor** See type II superconductor.
- high-flash naphtha** See heavy naphtha.
- high-flux isotope reactor** [NUCLEO] A thermal research reactor at the Oak Ridge National Laboratory, used mainly in the production of elements with atomic numbers greater than that of plutonium. Abbreviated HFIR.
- high foehn** [METEOROL] The occurrence of warm, dry air above the level of the general surface, accompanied by clear skies, resembling foehn conditions; it is due to subsiding air in an anticyclone, above a cold surface layer; in such circumstances the mountain peaks may be warmer than the lowlands. Also known as free foehn.
- high fog** [METEOROL] The frequent fog on the slopes of the coastal mountains of California, especially applied when the fog overtops the range and extends as stratus over the leeward valleys.
- high frequency** [COMMUN] Federal Communications Commission designation for the band from 3 to 30 megahertz in the radio spectrum. Abbreviated HF.
- high-frequency carrier telegraphy** [COMMUN] Form of carrier telegraphy in which the carrier currents have their frequencies above the range transmitted over a voice-frequency telephone channel.
- high-frequency compensation** [ELECTR] Increasing the amplification at high frequencies with respect to that at low and middle frequencies in a given band, such as in a video band or an audio band. Also known as high boost.
- high-frequency furnace** [ENG] An induction furnace in which the heat is generated within the charge, within the walls of the containing crucible, or within both, by currents induced by high-frequency magnetic flux produced by a surrounding coil. Also known as coreless-type induction furnace; high-frequency heater.
- high-frequency heater** See high-frequency furnace.
- high-frequency heating** See electronic heating.
- high-frequency propagation** [COMMUN] Propagation of radio waves in the high-frequency band, which depends entirely on reflection from the ionosphere.
- high-frequency recombination** [MICROBIO] A bacterial cell type, especially *Escherichia coli*, having an integrated F factor and characterized by a high frequency of recombination. Abbreviated Hfr.
- high-frequency resistance** [ELEC] The total resistance offered by a device in an alternating-current circuit, including the direct-current resistance and the resistance due to eddy current, hysteresis, dielectric, and corona losses. Also known as alternating-current resistance; effective resistance; radio-frequency resistance.
- high-frequency titration** [ANALY CHEM] A conductimetric titration in which two electrodes are mounted on the outside of the beaker or vessel containing the solution to be analyzed and an alternating current source in the megahertz range is used to measure the course of a titration.
- high-frequency transformer** [ELECTR] A transformer which matches impedances and transmits a frequency band in the carrier (or higher) frequency ranges.
- high-frequency triode** [ELECTR] A triode designed for operation at high frequency, having small spacings between the grid and the cathode, and anode, large emission and power densities, and low active and inactive capacitances.
- high-frequency voltmeter** [ELECTR] A voltmeter designed to measure currents alternating at high frequencies.
- high-frequency welding** [MET] Resistance welding in which the heat is produced by the current flow induced by a high-frequency electromagnetic field. Also known as radio-frequency welding.
- high-front shovel** [MECH ENG] A power shovel with a dipper stick mounted high on the boom for stripping and overburden removal.
- high-grade** [MIN ENG] To steal or pilfer ore or gold from a mine or miner.
- high-grade dynamite** [MATER] Dynamite of 40% strength or over.
- high hat** [ENG] A very low tripod head resembling a formal top hat in shape.
- high heat** [THERMO] Heat absorbed by the cooling medium in a calorimeter when products of combustion are cooled to the initial atmospheric (ambient) temperature.
- high-heat cement** [MATER] A type of cement which releases a large amount of heat during curing.
- high-helix drill** [DES ENG] A two-flute twist drill with a helix angle of 35-40°; used for drilling deep holes in metals, such as aluminum, copper, hard brass, and soft steel. Also known as fast-spiral drill.
- high-impedance voltmeter** [ELEC] A voltage-measuring device with a high-impedance input to reduce load on the unit under test; a vacuum-tube voltmeter is one type.